

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Status of the Claims

Claims 1, 5 and 6 are currently amended. Claim 8 was cancelled without prejudice or disclaimer. Claims 9-14 were withdrawn. Claims 15-21 are added. No new matter is added.

Claim Rejection under 35 U.S.C. 103

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otto (U.S. Patent No. 6,188,921) in view of Christopherson (U.S. Patent No. 6,339,047), Higashiyama Kazuhisa (JP 408106823) and Roberts (U.S. Patent No. 6,300,285).

Claim 1 recites a superconducting wire that includes among other features,

a cladding metal tube having a hollow interior with an oxide superconductor disposed within the hollow interior of the cladding metal tube and a cladding metal for cladding said oxide superconductor is in contact with the hollow interior of the cladding metal tube; and

the cladding metal tube comprising silver having an impurity concentration of 10 ppm to 500 ppm;

wherein the impurity included in said silver is at least one of Al, Fe, Cu, Ni, Si and Zn that imparts to the cladding metal tube a breaking strain of at least 30% in a stress-strain test.

The references of record, Otto, Christopherson, Higashiyama, and Roberts, alone or in combination fail to teach, suggest or render predictable the above recited features of claim 1. The features of claim 1 are unobvious over the references of record for at least two reasons, 1) the references of record fail to teach a cladding metal tube having a breaking strain of at least 30% in a stress strain test, and 2) the sheath that is strengthened in Roberts is the outer sheath (not an inner cladding metal tube) and, thus, does not have a hollow interior that is in contact with the oxide superconductor.

1) The References Of Record Fail To Teach A Cladding Metal Tube Having A Breaking Strain Of At Least 30% In A Stress Strain Test

With regard to Otto, Christopherson and Higashiyama the Examiner acknowledged that these references fail to disclose a cladding metal with a breaking strain of at least 30% in a stress-strain test. (Examiner Interview summary dated March 9, 2010, continuation sheet) However, the Examiner cites Roberts as disclosing a metal tube of silver where the strength/stiffness of the structure is increased. (Final Office Action dated June 23, 2010, page 3, lines 15-17).

Otto, Christopherson and Higashiyama each fail to teach, suggest or render predictable the impurity imparts to the cladding metal a breaking strain of at least 30%. Instead, Otto teaches using Ga as the impurity in much higher concentrations than recited in claim 1. (Otto, Column 14, lines 44 to 65 and Table 1) While Christopherson teaches high-purity silver usually contains some amount of impurity (Col. 4, ll. 14-16), Christopherson fails to disclose the claimed numerical range of the impurity concentration or the impurities and the effect, thereof. Hagashiyama also fails to teach or suggest the cladding metal having a breaking strain of at least 30%.

Roberts also fails to teach or suggest a silver cladding metal a cladding metal having a breaking strain of at least 30% in a stress-strain test. Instead, Roberts teaches a “multifilamentary superconducting tape prepared by placing a multiple fine silver tubes containing Bi-2223 powder into a larger silver tube or sheath.” (Col. 4, ll. 52-55) Roberts teaches, strengthening the “metallic tube or sheath of the wire” by “oxide dispersion strengthening (i.e., OSD-Ag alloys).” (Col. 3, ll. 34-44) Roberts fails to mention the cladding metal having a breaking strain of at least 30% and fails to recognize the related advantages thereof. For example, the frequency of the occurrence of cracking and breakage of the cladding metal may be reduced during the manufacturing steps. (Original Specification, page 18, line 26 to page 19, line 5). Therefore, features of claim 1 are not taught or suggested by the references of record.

2) The Sheath That Is Strengthened In Roberts Does Not Have A Hollow Interior That Is In Contact With The Oxide Superconductor.

Roberts fails to teach or suggest at least the above recited features of claim 1. Instead, Roberts teaches a “multifilamentary superconducting tape prepared by placing a multiple fine

silver tubes containing Bi-2223 powder into a larger silver tube or sheath.” (Col. 4, ll. 52-55) Roberts strengthens the “metallic tube or sheath of the wire” by “oxide dispersion strengthening (i.e., OSD-Ag alloys).” (Col. 3, ll. 34-44) The sheath in Robert refers to the outer tube that is placed around a multifilamentary wire, and is not a cladding metal tube having an hollow interior that is in contact with the oxide superconductor. Roberts does not teach or suggest strengthening the cladding metal tube. Instead, Roberts strengthens the outer tube placed around the cladding metal tube by oxide dispersion strengthening.

The ODS process disclosed in Roberts focuses on increasing the strength of a sheath metal. However, a cladding metal tube with at least 30% breaking strain achieves a balance between strength and ductability to reduce the longitudinal cracking and breakage during rolling and processing of the cladding metal or clad wire. (Original Specification, page 5, lines 3-7) As disclosed in the Original Specification, a stronger metal would crack or break faster during rolling or other processing. Thus, the ODS strengthened sheath of Roberts fails to teach or suggest a cladding metal having a breaking strain of at least 30% in a stress-strain test.

Accordingly, Otto, Christopherson, Higashiyama and Roberts, alone or in combination fail to teach or suggest the features of claim 1. Therefore, claim 1 is believed to be allowable. Because claims 2-7 depend from claim 1 they are believed to be allowable for at least the same reasons claim 1 is believed to be allowable.

New Claims

New claims 15-21 are added to further protect aspects of the present invention. New claims 15-17 depend, directly or indirectly from claim 1 and thus are believed to be allowable for at least the same reasons claim 1 is believed to be allowable.

New claim 15 recites, among other features, the oxide superconductor fills the hollow interior of the cladding metal tube. The references of record fail to teach or suggest at least the above recites features of claim 15. Instead, Roberts discloses the fine silver tubes containing Bi-2223 powder and the sheath that is strengthened surrounds the fine silver tubes. Therefore, claim 15 is believed to be allowable.

New claim 16 recites, a sheath having a plurality of cladding metal tubes disposed within and in contact with at least one cladding metal tube. The references of record fail to teach or suggest at least the above recites features of claims 1 and 16. Roberts recites a sheath surrounding multiple fine silver tubes, however, Roberts recites strengthening the sheath instead of the silver tubes. (Col. 3, ll. 34-44 and Col 5, ll. 52-54). Therefore, claim 16 is believed to be allowable.

New claim 17 depends from claims 1 and 16, and is believed to be allowable for at least the same reasons claims 1 and 16 are believed to be allowable. Claim 17 further recites, a plurality of the cladding metal tubes according to claim 1 that includes a sheath metal tube having an interior containing the plurality of cladding metal tubes and the sheath metal tube being in contact with at least one of the cladding metal tubes. The references of record fail to teach or suggest at least the above recites features of claims 1, 16 and 17. Claim 1 recites a cladding metal tube having a breaking strain of at least 30% in a stress-strain test. Instead, Roberts recites a sheath surrounding multiple fine silver tubes, but, Roberts recites strengthening the sheath instead of the silver tubes. (Col. 3, ll. 34-44 and Col 5, ll. 52-54) Therefore, claim 17 is believed to be allowable.

New independent claim 18 recites all of the features of claim 1 and further recites, a sheath metal tube having a plurality of clad wires disposed within, the sheath metal surrounding the plurality of clad wires. Claim 18 is believed to be allowable for at least the same reasons claim 1 is believed to be allowable. Claim 18 further distinguishes the cladding metal tube from the sheath metal surrounding the plurality of clad wire. Roberts teaches strengthening the sheath whereas, claim 18 is directed to the breaking strain of on the cladding metal tubes that are surrounded by the sheath.

Accordingly claim 18 is believed to be allowable. Because claims 19-21 depend from claim 18, they are believed to be allowable for at least the same reasons claim 18 is believed to be allowable.

Concluding Remarks

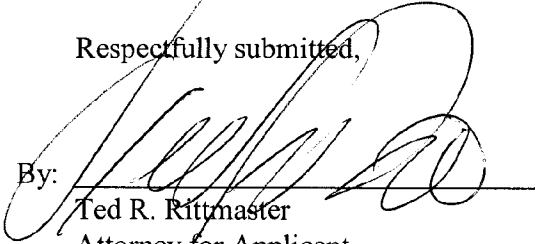
After amending the claims as set forth above, claims 1-7, and 15-21 are now pending in this application.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

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